Topic: Quadratic formula

Question: Use the quadratic formula to solve for the variable.

$$3x^2 + 2x - 1 = 0$$

Answer choices:

A $x = \frac{1}{3}, 1$

B $x = -1, \frac{1}{3}$

C $x = -\frac{1}{3}, 1$

D $x = 2, 3$

© Krista King Math

Solution: B

We can factor this quadratic equation directly as,

$$3x^2 + 2x - 1 = 0$$

$$(3x - 1)(x + 1) = 0$$

So the solutions are

$$3x - 1 = 0$$

$$3x = 1$$

$$x = \frac{1}{3}$$

or

$$x + 1 = 0$$

$$x = -1$$

but since we've been asked to use the quadratic formula to find the solutions, we'll solve it with the formula. If $ax^2 + bx + c = 0$, then the quadratic formula is

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

If we compare the standard form of a quadratic equation to the equation we've been given in this problem, we can say that

$$a = 3$$

© Krista King Math

$$b = 2$$

$$c = -1$$

Plugging these values into the quadratic formula, we get

$$x = \frac{-(2) \pm \sqrt{(2)^2 - 4(3)(-1)}}{2(3)}$$

$$x = \frac{-2 \pm \sqrt{4 + 12}}{6}$$

$$x = \frac{-2 \pm \sqrt{16}}{6}$$

$$x = \frac{-2 \pm 4}{6}$$

So the solutions are

$$x = \frac{-2 + 4}{6}$$

$$x = \frac{2}{6}$$

$$x = \frac{1}{3}$$

and

$$x = \frac{-2 - 4}{6}$$

© Krista King Math

$$x = \frac{-6}{6}$$

$$x = -1$$

© Krista King Math

Topic: Quadratic formula

Question: Find the solution(s) to the polynomial function.

$$2x^2 - 7x - 3 = 0$$

Answer choices:

A $x = \frac{7 + \sqrt{73}}{4}$ and $x = \frac{7 - \sqrt{73}}{4}$

B $x = \frac{7 + \sqrt{73}}{2}$ and $x = \frac{-7 + \sqrt{73}}{2}$

C $x = \frac{-7 + \sqrt{73}}{4}$ and $x = \frac{-7 - \sqrt{73}}{4}$

D $x = \frac{7 + \sqrt{73}}{2}$ and $x = \frac{7 - \sqrt{73}}{2}$

© Krista King Math

Solution: A

Since the polynomial can't be factored, we have to use the quadratic formula,

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

to find the solutions, or roots, of the function. Remember that, in order to use the quadratic formula, we need our polynomial function in the form

$$ax^2 + bx + c = 0$$

Our function is already in this form, so we'll match it up to the form above to identify a, b and c before we plug them into the quadratic formula.

Matching up $2x^2 - 7x - 3 = 0$ with $ax^2 + bx + c = 0$, we see that

$$a = 2$$

$$b = -7$$

$$c = -3$$

Plugging these values into the quadratic formula, we get

$$x = \frac{-(-7) \pm \sqrt{(-7)^2 - 4(2)(-3)}}{2(2)}$$

$$x = \frac{7 \pm \sqrt{49 + 24}}{4}$$

© Krista King Math

$$x = \frac{7 \pm \sqrt{73}}{4}$$

Therefore, the roots of our function are

$$x = \frac{7 + \sqrt{73}}{4} \quad \text{and} \quad x = \frac{7 - \sqrt{73}}{4}$$

© Krista King Math